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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,167	02/13/2004	Hideyuki Nishikawa	019519-418	4460

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EXAMINER	
HON, SOW FUN	
ART UNIT	PAPER NUMBER
1772	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/28/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/777,167	NISHIKAWA ET AL.	
	Examiner	Art Unit	
	Sow-Fun Hon	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 6-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 6-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see remarks, filed 11/22/06, with respect to the rejections of claims 1-3, 6-11 under 35 U.S.C. 103(a) over Yamahara, have been fully considered and are persuasive. Furthermore, upon further consideration, new ground(s) of rejection is made in light of the new art introduced, US 5,016,988. Therefore, finality of the Office action, dated 06/22/06, has been withdrawn.

New Rejections

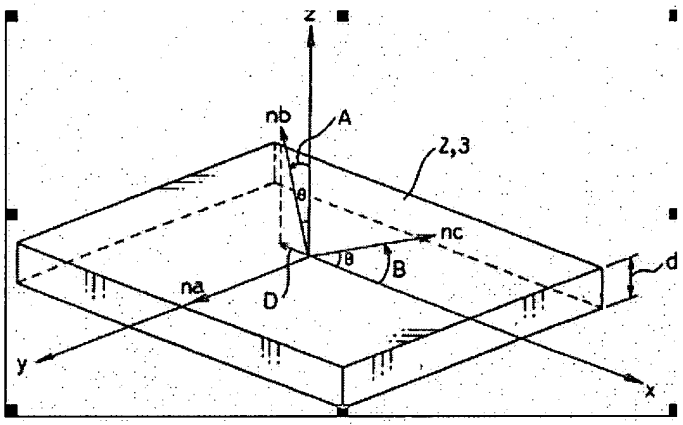
Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-2, 6-7, 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara (US 6,839,110), as further evidenced by Iimura (US 5,016,988).

Regarding claim 1, Yamahara teaches a retardation film (phase difference film, also known as a phase difference plate, column 9, lines 35-36) comprising a transparent support (column 8, lines 20-26) positioned in a plane (See Fig. 1, wherein 2 and 3 are the phase difference films or plates, column 8, lines 20-25). Yamahara teaches at least one optically anisotropic layer which exhibits biaxiality (column 8, line 58), having a first direction a with a smallest refractive index na (na<nb<nc, column 8, lines 55-60), and a second direction with a largest refractive index nc (na<nb<nc, column 8, lines 55-60),

wherein the first direction a is orthogonal to the z-axis, which is a direction normal to the xy-plane of the transparent support (direction of principal refractive index na coincides with the direction of the y-coordinate axis, the x, y and z-coordinate axes that are orthogonal to each other, column 8, lines 40-45, Fig. 3, shown below).



Yamahara teaches that nb is rotated at an angle θ from the z-axis (inclines θ by in the direction of arrow A with respect to the z-coordinate axis, column 8, lines 44-46, 20°, column 11, lines 39-45) in the xz-plane (in a direction that is perpendicular to the surface, column 8, lines 46-48), and nc, which is the second direction with the largest refractive index, is rotated the same angle θ from the x-axis, in the xz-plane (inclined by about 20° in the direction of arrow B with respect to the x-coordinate axis, column 8, lines 44-46). Thus nc is at an angle of (90° - θ) from the z-axis, in the xz-plane, wherein the z-axis is the direction normal to the plane of the transparent support. Yamahara fails to teach in this first embodiment, that θ is substantially 0° so that the second direction nc substantially coincides with the x-axis in the xz-plane, wherein the angle

between the second direction nc and the direction normal to the xy-plane, the z-axis, is substantially 90°, within the range of 80° to 100°.

However, Yamahara teaches in a second embodiment, that all three principal refractive indices na, nb and nc are orthogonal to each other, wherein the angle θ is substantially 0°, so that the second direction nc substantially coincides with the x-axis in the xz-plane, wherein the angle between the second direction nc and the direction normal to the xy-plane, the z-axis, is substantially 90°, within the claimed range of 80° to 100°, for the purpose of providing the desired refractive index ellipsoid which does not incline with respect to the transparent substrate (phase different plate, column 17, lines 15-18), and hence the desired phase retardation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a θ which is substantially 0°, in lieu of 20° in the first embodiment of Yamahara, so that the second direction nc substantially coincides with the x-axis in the xz-plane, wherein the angle between the second direction nc and the direction normal to the xy-plane, the z-axis, is substantially 90°, within the range of 80° to 100°, in order to provide the desired refractive index ellipsoid which does not incline with respect to the transparent substrate, and hence the desired phase retardation, as taught by Yamahara, and as further evidenced by Iimura.

Iimura teaches a retardation film comprising an optically anisotropic layer (birefringent compensator, title, birefringent layer, column 2, lines 8-10), which exhibits biaxiality (birefringence layer has a three-dimensional refractive index anisotropy, column 4, lines 59-61), having a first direction with a smallest refractive index (the

minimum refractive index ny, [direction y] in the birefringent layer face parallel to the substrate surface, column 2, lines 16-22), and a second direction with a largest refractive index (maximum refractive index nx, direction x, column 2, lines 16-20), wherein the second direction x is orthogonal to the z direction which is normal to the xy-plane of the support, the angle between the second direction and the direction normal to the plane of the support being 90° (direction perpendicular to the x direction in the birefringent layer face parallel to the substrate surface is defined as a y direction, and the direction perpendicular to both x and y directions is defined as a z direction, column 5, lines 64-68, and the refractive indexes in these directions are defined as nx, ny and nz respectively, column 6, lines 1-2).

Regarding claim 2, Yamahara teaches that the liquid crystal phase is a biaxial liquid crystal phase (positive refractive index anisotropy, column 8, lines 23-25).

Regarding claim 6, Yamahara fails to teach that the retardation film further comprises an alignment film between the transparent support and said at least one optically anisotropic layer.

However, Yamahara teaches that an alignment layer (11,14) is used to align the liquid crystal in the liquid crystal cell (16, column 8, lines 11-15), and that the liquid crystal in the anisotropic layer is treated with an orientation technique (column 8, lines 25-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used an alignment layer between the transparent support and said at least one optically anisotropic layer of the retardation film of

Yamahara, to align the liquid crystal in the anisotropic layer of the retardation film in the liquid crystal cell of Yamahara, in order to obtain the desired orientation provided by the alignment layer, as taught by Yamahara.

Regarding claim 7, Yamahara teaches that the compound exhibiting the biaxial liquid crystal phase is a polymer compound (liquid crystal polymer with a positive refractive index anisotropy provided on the support, column 8, lines 21-26).

Regarding claim 10, Yamahara teaches that the liquid crystal polymer is treated with an oblique orientation technique or hybrid orientation (column 8, lines 25-28), which means that the at least one optically anisotropic layer, formed from the at least one compound exhibiting a liquid crystal phase, is not stretched.

Regarding claim 11, Yamahara teaches that the retardation film, which is elliptically optically-anisotropic (phase difference plate 2 has a refractive index ellipsoid, column 8, 28-30), abuts a polarizing film (overlapping plate 4, column 8, lines 19-30, Figure 1), to constitute an elliptically polarizing film.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara, as further evidenced by Iimura, as applied to claims 1-2, 6-7,10-11 above, and further in view of Ono (US 6,712,896).

Yamahara, as further evidenced by Iimura, teaches a retardation film comprising: a transparent support positioned in a plane; and at least one optically anisotropic layer having a first direction with a smallest refractive index, and a second direction with a largest refractive index, wherein said at least one optically anisotropic layer is formed of at least one compound exhibiting a liquid crystal phase; said at least one optically

anisotropic layer exhibits biaxiality; and the first direction is orthogonal to a direction normal to the plane of the transparent support, wherein it would have been obvious to one of ordinary skill in the art to have provided an angle between the second direction and the direction normal to the plane of the transparent support within the range of 80 to 100°, as discussed above. Yamahara, as further evidenced by Iimura, fails teach that the biaxial liquid crystal phase is a biaxial nematic liquid crystal phase.

However, Ono teaches a retardation film (optical compensation film, column 26, line 50) which has an optically anisotropic layer on a support, wherein the optically anisotropic layer comprises a compound which more preferably exhibits a biaxial nematic liquid crystal phase (column 26, lines 55-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a compound which exhibits a biaxial nematic liquid crystal phase in the optically anisotropic layer of the retardation film of Yamahara, as further evidenced by Iimura, in order to provide the desired retardation properties, as taught by Ono.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara in view of Ono, as further evidenced by Iimura as applied to claims 1-3, 6-7, 10-11 above, and further in view of Cannon KK (Derwent abstract of JP 50103485A).

Yamahara, as further evidenced by Iimura, teaches a retardation film comprising: a transparent support positioned in a plane; and at least one optically anisotropic layer having a first direction with a smallest refractive index, and a second direction with a largest refractive index, wherein said at least one optically anisotropic layer is formed of

at least one compound exhibiting a liquid crystal phase; said at least one optically anisotropic layer exhibits biaxiality; and the first direction is orthogonal to a direction normal to the plane of the transparent support, wherein an angle between the second direction and the direction normal to the plane of the transparent support within the range of 80 to 100°, as discussed above. Yamahara, as further evidenced by Iimura, fails teach that fails to teach that the alignment film comprises a polymer having at least one of a hydrophobic group and an excluded-volume group.

However, Cannon KK teaches an alignment film (coated with mol. orientation promoting agent, abstract) comprising a polymer having at least one of a hydrophobic group and an excluded-volume group (alkali metal salt of the poly(acrylic acid, partial ester, abstract) as defined by Applicant's specification (original claims 8-9), wherein the ester is the hydrophobic group, and the alkali metal salt group is the excluded-volume group. Cannon KK teaches that the polymer (mol. orientation promoting agent) aligns nematic liquid crystals vertically with no degradation of the liquid crystal properties and hence improves service lifetime for the device (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the polymer of Cannon KK, having at least one of a hydrophobic group and an excluded-volume group, as defined by Applicant, in the alignment film in the retardation film which is obvious over Yamahara, as further evidenced by Iimura, in order to align liquid crystals with nematic phase vertically with no degradation of the liquid crystal properties and hence improve the service lifetime for the retardation film of Yamahara, as taught by Cannon KK.

5. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara, as further evidenced by Iimura, as applied to claims 1-2, 6-7,10-11 above, and further in view of Negoro (US 6,540,940).

Yamahara, as further evidenced by Iimura, teaches a retardation film comprising: a transparent support positioned in a plane; and at least one optically anisotropic layer having a first direction with a smallest refractive index, and a second direction with a largest refractive index, wherein said at least one optically anisotropic layer is formed of at least one compound exhibiting a liquid crystal phase; said at least one optically anisotropic layer exhibits biaxiality; and the first direction is orthogonal to a direction normal to the plane of the transparent support, wherein an angle between the second direction and the direction normal to the plane of the transparent support within the range of 80 to 100°; and wherein the retardation film can further comprise an alignment film between the transparent support and said at least one optically anisotropic layer, as discussed above. In addition, Yamahara teaches that the liquid crystal in the optically anisotropic layer is discotic (column 19, lines 54-60, column 20, lines 60-65). Yamahara, as further evidenced by Iimura, fails to teach that the alignment layer comprises a polymer having at least one of a hydrophobic group and an excluded volume group, let alone that it comprises a repeating unit represented by Applicant's formula (I) and a repeating unit represented by Applicant's formula (II) or (III).

However, Negoro teaches a retardation film (an optical compensatory sheet) comprising: a transparent support (substrate), an alignment film (orientation) layer and an optically anisotropic layer compound exhibiting a liquid crystal phase (liquid crystal,

column 91, lines 22-31), wherein the alignment film comprises an acrylic copolymer or methacrylic copolymer comprising a repeating unit represented by formula (I) of Applicant and a repeating unit represented by formula (II) or (III) of Applicant, which is a species of the polymer having at least one of a hydrophobic group and an excluded volume group, as defined by Applicant (original claim 8 is generic to original claim 9). Negoro teaches that the alignment layer is particularly effective in aligning discotic liquid crystal, for the purpose of providing a display with a clear image having high contrast (column 4, lines 25-35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the specific alignment film of Negoro, to align the discotic liquid crystal in the retardation film of Yamahara, in order to provide a display with a clear image having high contrast, as taught by Negoro.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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S. Hon

Sow-Fun Hon

12/22/06

RENA DYE
SUPERVISORY PATENT EXAMINER